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# Ability of Two Natural Products, Nootkatone and Carvacrol, to Suppress *Ixodes scapularis* and *Amblyomma americanum* (Acari: Ixodidae) in a Lyme Disease Endemic Area of New Jersey

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### ABSTRACT

We evaluated the ability of the natural, plant-derived acaricides nootkatone and carvacrol to suppress *Ixodes scapularis* Say and *Amblyomma americanum* (L.) (Acari: Ixodidae). Aqueous formulations of 1 and 5% nootkatone applied by backpack sprayer to the forest litter layer completely suppressed *I. scapularis* nymphs through 2 d. Thereafter, the level of reduction gradually declined to ≤50% at 28 d postapplication. Against *A. americanum* nymphs, 1% nootkatone was less effective, but at a 5% concentration, the level of control was similar or greater to that observed with *I. scapularis* through 21 d postapplication. Initial applications of 0.05% carvacrol were ineffective, but a 5% carvacrol formulation completely suppressed nymphs of both species through 2 d and resulted in significant reduction in *I. scapularis* and *A. americanum* nymphs through 28 and 14 d postapplication, respectively. Backpack sprayer applications of 5%

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nootkatone to the shrub and litter layers resulted in 100% control of *I. scapularis* adults through 6 d, but the level of reduction declined to 71.5% at 28 d postapplication. By contrast, high-pressure applications of 2% nootkatone to the litter layer resulted in 96.2–100% suppression of both *I. scapularis* and *A. americanum* nymphs through 42 d, whereas much lower control was obtained from the same formulation applied by backpack sprayer. Backpack sprayer application of a 3.1% nootkatone nanoemulsion resulted in 97.5–98.9 and 99.3–100% reduction in *I. scapularis* and *A. americanum* nymphs, respectively, at 1 d postapplication. Between 7 d and 35 d postapplication, the level of control varied between 57.1% and 92.5% for *I. scapularis* and between 78.5 and 97.1% for *A. americanum* nymphs. The ability of natural products to quickly suppress and maintain significant control of populations of these medically important ticks at relatively low concentrations may represent a future alternative to the use of conventional synthetic acaricides.

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